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#4

SEQUENCE LISTING

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<120> Novel Oncolytic Adenoviral Vectors

<130> 4-31704A/GTI

<140> US 10/081,969
<141> 2002-02-22

<150> US 60/270,922
<151> 2001-02-23

<150> US 60/295,037
<151> 2001-06-01

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<151> 2000-01-14

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<170> PatentIn version 3.1

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<400> 1
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caaatttcac aaataaagca ttttttttcac tgcattctag ttgtggtttg tccaaactca 120

tcaatgtatc ttatcatgtc 140

<210> 2
<211> 600
<212> DNA
<213> Human adenovirus type 5

<220>
<221> misc_feature
<222> (1)..(600)
<223> Fig. 2- E1A transcrition control region

<400> 2
catcatcaat aatatacctt attttggatt gaagccaata tgataatgag ggggtggagt 60

ttgtgacgtg gcgcggggcg tgggaacggg gcgggtgacg tagtagtgtg gcggaagtgt 120

gatgttgcaa gtgtggcgga acacatgtaa gcgacggatg tggcaaaagt gacgtttttg 180

gtgtgcgccg gtgtacacag gaagtgacaa ttttcgcgcg gttttaggcg gatgttgtag 240

taaatttggg cgtaaccgag taagatttgg ccattttcgc gggaaaactg aataagagga 300

agtgaaatct gaataatttt gtgttactca tagcgcgtaa tatttgtcta gggccgcggg 360

gactttgacc gtttacgtgg agactcgccc aggtgttttt ctcaggtgtt ttccgcgttc 420

cgggtcaaag ttggcgtttt attattatag tcagctgacg tgtagtgtat ttatacccgg 480

tgagttcctc aagaggccac tcttgagtgc cagcgagtag agttttctcc tccgagccgc 540

tccgacaccg ggactgaaaa tgagacatat tatctgccac ggaggtgtta ttaccgaaga 600

<210> 3
<211> 1802
<212> DNA
<213> artificial Sequence

<220>
<223> viral vector construct

<220>
<221> misc_feature
<222> (1)..(1802)
<223>

<220>
<221> misc_feature
<222> (1)..(1802)
<223> Fig. 3 A-Left end of Ar6pAE2fF sequence

<400> 3
catcatcaat aatatacctt attttggatt gaagccaata tgataatgag ggggtggagt 60

ttgtgacgtg gcgcggggcg tgggaacggg gcgggtgacg tagggcgcga tcaagcttat 120

cgataccgtc gaaacttgtt tattgcagct tataatggtt acaaataaag caatagcatc 180

acaaatttca caaataaagc attttttttca ctgcattcta gttgtggttt gtccaaactc 240

atcaatgtat cttatcatgt ctggatccgc gccgctagcg atcatccgga caaagcctgc 300

gcgcgccccg ccccgccatt ggccgtaccg ccccgcgccg ccgccccatc tcgcccctcg 360

ccgccgggtc cggcgcgtta aagccaatag gaaccgccgc cgttgttccc gtcacggccg 420

gggcagccaa ttgtggcggc gctcggcggc tcgtggctct ttcgcggcaa aaaggatttg 480

gcgcgtaaaa gtggccggga ctttgcaggc agcggcggcc gggggcggag cgggatcgag 540

ccctcgatga tatcagatca tcggatcccg gtcgactgaa aatgagacat attatctgcc 600

acggaggtgt tattaccgaa gaaatggccg ccagtctttt ggaccagctg atcgaagagg 660

tactggctga taatcttcca cctcctagcc attttgaacc acctaccctt cacgaactgt 720

atgatttaga cgtgacggcc cccgaagatc ccaacgagga ggcggtttcg cagatttttc 780

ccgactctgt aatgttggcg gtgcaggaag ggattgactt actcactttt ccgccggcgc 840

ccggttctcc ggagccgcct caccttccc ggcagcccga gcagccggag cagagagcct 900

tgggtccggt ttctatgcca aaccttgtac cggaggtgat cgatcttacc tgccacgagg 960

ctggctttcc acccagtgac gacgaggatg aagagggtga ggagtttgtg ttagattatg 1020

tggagcaccc cgggcacggt tgcaggtctt gtcattatca ccggaggaat acgggggacc 1080

cagatattat gtgttcgctt tgctatatga ggacctgtgg catgtttgtc tacagtaagt 1140

gaaaattatg ggcagtgggt gatagagtgg tgggtttggt gtggtaattt ttttttaat 1200

ttttacagtt ttgtggttta aagaattttg tattgtgatt tttttaaaag gtcctgtgtc 1260

tgaacctgag cctgagcccg agccagaacc ggagcctgca agacctaccc gccgtcctaa 1320

aatggcgcct gctatcctga gacgcccgac atcacctgtg tctagagaat gcaatagtag 1380

tacggatagc tgtgactccg gtccttctaa cacacctcct gagatacacc cggtggtccc 1440

gctgtgcccc attaaaccag ttgccgtgag agttggtggg cgtcgccagg ctgtggaatg 1500

tatcgaggac ttgcttaacg agcctgggca acctttggac ttgagctgta aacgccccag 1560

gccataaggt gtaaacctgt gattgcgtgt gtggttaacg cctttgtttg ctgaatgagt 1620

tgatgtaagt ttaataaagg gtgagataat gtttaacttg catggcgtgt taaatggggc 1680

ggggcttaaa gggtatataa tgcgccgtgg gctaatcttg gttacatctg acctcatgga 1740

ggcttgggag tgtttggaag atttttctgc tgtgcgtaac ttgctggaac agagctctaa 1800

ca 1802

<210> 4
<211> 532
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(532)
<223> Fig. 3 B- right end of of Arp6AE2fF sequence

<400> 4
aacctacgcc cagaaacgaa agccaaaaaa cccacaactt cctcaaatcg tcacttccgt 60

tttcccacgt tacgtcactt cccattttaa ttaagaattc tacaattccc aacacataca 120

agttactccg ccctaaaacc ctgggcgagt ctccacgtaa acggtcaaag tccccgcggc 180

cctagacaaa tattacgcgc tatgagtaac acaaaattat tcagatttca cttcctctta 240

ttcagttttc ccgcgaaaat ggccaaatct tactcggtta cgcccaaatt tactacaaca 300

tccgcctaaa accgcgcgaa aattgtcact tcctgtgtac accggcgcac accaaaaacg 360

tcacttttgc cacatccgtc gcttacatgt gttccgccac acttgcaaca tcacacttcc 420

gccacactac tacgtcaccc gccccgttcc cacgccccgc gccacgtcac aaactccacc 480

ccctcattat catattggct tcaatccaaa ataaggtata ttattgatga tg 532

<210> 5
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector construct

<220>
<221> misc_feature
<222> (1)..(660)
<223> Fig. 4-Left end of Ar6F sequence

<400> 5
catcatcaat aatatacctt attttggatt gaagccaata tgataatgag ggggtggagt 60

ttgtgacgtg gcgcggggcg tgggaacggg gcgggtgacg tagggcgcgc cgctagcgat 120

atcggatccc ggtcgactga aaatgagaca tattatctgc cacggaggtg ttattaccga 180

agaaatggcc gccagtcttt tggaccagct gatcgaagag gtactggctg ataatcttcc 240

acctcctagc cattttgaac cacctaccct tcacgaactg tatgatttag acgtgacggc 300

ccccgaagat cccaacgagg aggcggtttc gcagattttt cccgactctg taatgttggc 360

ggtgcaggaa gggattgact tactcacttt tccgccggcg cccggttctc cggagccgcc 420

tcacctttcc cggcagcccg agcagccgga gcagagagcc ttgggtccgg tttctatgcc 480

aaaccttgta ccggaggtga tcgatcttac ctgccacgag gctggctttc cacccagtga 540

cgacgaggat gaagagggtg aggagtttgt gttagattat gtggagcacc ccgggcacgg 600

ttgcaggtct tgtcattatc accggaggaa tacgggggac ccagatatta tgtgttcgct 660

<210> 6
<211> 660
<212> DNA
<213> Artificial Sequence

<220>
<223> Fig. 5- left end of Ar6pAF sequence

<220>
<221> misc_feature
<222> (1)..(660)
<223> Fig. 5- left end of Ar6pAF sequence

<400> 6
catcatcaat aatatacctt attttggatt gaagccaata tgataatgag ggggtggagt 60

ttgtgacgtg gcgcggggcg tgggaacggg gcgggtgacg tagggcgcga tcaagcttat 120

cgataccgtc gaaacttgtt tattgcagct tataatggtt acaaataaag caatagcatc 180

acaaatttca caaataaagc attttttttca ctgcattcta gttgtggttt gtccaaactc 240

atcaatgtat cttatcatgt ctggatccgc gccgctagcg atatcggatc ccggtcgact 300

gaaaatgaga catattatct gccacggagg tgttattacc gaagaaatgg ccgccagtct 360

tttggaccag ctgatcgaag aggtactggc tgataatctt ccacctccta gccattttga 420

accacctacc cttcacgaac tgtatgattt agacgtgacg gcccccgaag atcccaacga 480

ggaggcggtt tcgcagattt ttcccgactc tgtaatgttg gcggtgcagg aagggattga 540

cttactcact tttccgccgg cgcccggttc tccggagccg cctcaccttt cccggcagcc 600

cgagcagccg gagcagagag ccttgggtcc ggtttctatg ccaaaccttg taccggaggt 660

<210> 7
<211> 949
<212> DNA
<213> Murine

<220>
<221> CDS
<222> (182)..(640)
<223>

<400> 7
ttccggacag acctcaataa ctctgtttac cagaacagga ggtgagctta gaaaaccctt 60

agggtattag gccaaaggcg cagctactgt ggggtttatg aacaattcaa gcaactctac 120

gggctattct aattcaggtt tctctagccg ggctgcagga attcgatggc cgctacctac 180

```
a atg gcc cac gag aga aag gct aag gtc ctg agg agg atg tgg ctg cag    229
  Met Ala His Glu Arg Lys Ala Lys Val Leu Arg Arg Met Trp Leu Gln
  1               5                  10                  15

aat tta ctt ttc ctg ggc att gtg gtc tac agc ctc tca gca ccc acc    277
Asn Leu Leu Phe Leu Gly Ile Val Val Tyr Ser Leu Ser Ala Pro Thr
            20                  25                  30

cgc tca ccc atc act gtc acc cgg cct tgg aag cat gta gag gcc atc    325
Arg Ser Pro Ile Thr Val Thr Arg Pro Trp Lys His Val Glu Ala Ile
        35                  40                  45

aaa gaa gcc ctg aac ctc ctg gat gac atg cct gtc aca ttg aat gaa    373
Lys Glu Ala Leu Asn Leu Leu Asp Asp Met Pro Val Thr Leu Asn Glu
    50                  55                  60

gag gta gaa gtc gtc tct aac gag ttc tcc ttc aag aag cta aca tgt    421
Glu Val Glu Val Val Ser Asn Glu Phe Ser Phe Lys Lys Leu Thr Cys
65                  70                  75                  80

gtg cag acc cgc ctg aag ata ttc gag cag ggt cta cgg ggc aat ttc    469
Val Gln Thr Arg Leu Lys Ile Phe Glu Gln Gly Leu Arg Gly Asn Phe
                85                  90                  95

acc aaa ctc aag ggc gcc ttg aac atg aca gcc agc tac tac cag aca    517
Thr Lys Leu Lys Gly Ala Leu Asn Met Thr Ala Ser Tyr Tyr Gln Thr
            100                 105                 110

tac tgc ccc cca act ccg gaa acg gac tgt gaa aca caa gtt acc acc    565
Tyr Cys Pro Pro Thr Pro Glu Thr Asp Cys Glu Thr Gln Val Thr Thr
        115                 120                 125

tat gcg gat ttc ata gac agc ctt aaa acc ttt ctg act gat atc ccc    613
Tyr Ala Asp Phe Ile Asp Ser Leu Lys Thr Phe Leu Thr Asp Ile Pro
    130                 135                 140

ttt gaa tgc aaa aaa cca gtc caa aaa tgaggaagcc caggccagct          660
Phe Glu Cys Lys Lys Pro Val Gln Lys
145                 150

ctgaatccag cttctcagac tgctgctttt gtgcctgcgt aatgagccag gaactcggaa    720

tttctgcctt aaagggacca agagatgtgg cacaggtagt cgaatcaagc ttatcgatac    780

cgtcgacctc gactagataa cttcgtataa tgtatgctat acgaagttat gctagaaatg    840

gacggaatta ttacagagca gcgcctgcta gaaagacgca gggcagcggc cgagcaacag    900

cgcatgaatc aagagctcca agacatggtt aacttgcacc agtgcaaaa               949
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<210> 8
<211> 153
<212> PRT
<213> Murine

<400> 8

```
Met Ala His Glu Arg Lys Ala Lys Val Leu Arg Arg Met Trp Leu Gln
1               5                  10                  15
```

```
Asn Leu Leu Phe Leu Gly Ile Val Val Tyr Ser Leu Ser Ala Pro Thr
            20                  25                  30

Arg Ser Pro Ile Thr Val Thr Arg Pro Trp Lys His Val Glu Ala Ile
        35                  40                  45

Lys Glu Ala Leu Asn Leu Leu Asp Asp Met Pro Val Thr Leu Asn Glu
    50                  55                  60

Glu Val Glu Val Val Ser Asn Glu Phe Ser Phe Lys Lys Leu Thr Cys
65                  70                  75                  80

Val Gln Thr Arg Leu Lys Ile Phe Glu Gln Gly Leu Arg Gly Asn Phe
                85                  90                  95

Thr Lys Leu Lys Gly Ala Leu Asn Met Thr Ala Ser Tyr Tyr Gln Thr
            100                 105                 110

Tyr Cys Pro Pro Thr Pro Glu Thr Asp Cys Glu Thr Gln Val Thr Thr
        115                 120                 125

Tyr Ala Asp Phe Ile Asp Ser Leu Lys Thr Phe Leu Thr Asp Ile Pro
    130                 135                 140

Phe Glu Cys Lys Lys Pro Val Gln Lys
145                 150
```

<210> 9
<211> 23
<212> DNA
<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(23)
<223> Fig. 26a. Sequence of Native E3 region.

<400> 9
cgccacccaa gatgattagg tac 23

<210> 10
<211> 15
<212> DNA
<213> Artificial Sequence

<220>

<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(15)
<223> Fig. 26b(3). Sequence at the junction between E3-6.7 and GM-CSF.

<400> 10
cgccacccaa gatga 15

<210> 11
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(20)
<223> Fig. 26b(4). Sequence at the junction between E3-6.7 and GM-CSF.

<400> 11
cgccacccaa gatgaccatg 20

<210> 12
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(21)
<223> Fig. 26b(5). Sequence at the junction between E3-6.7 and GM-CSF

<400> 12
cgccacccaa gatgacaatt c 21

<210> 13
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> MISC_FEATURE
<222> (1)..(4)
<223> Fig. 26a and 26b

<400> 13

Arg His Pro Arg
1

<210> 14
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(23)
<223> Fig. 38a. Sequence of native E3-14.5/E3-14.7 junction

<400> 14
ggaggagatg actgattagg tac 23

<210> 15
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
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<222> (1)..(20)
<223> Fig.38b. Sequence of the Ar16pAEfhGM vector at the junction betwe
en the E3-14.5 gene and human GM-CSF cDNA

<400> 15
ggaggagacg actgaccatg 20

<210> 16
<211> 4
<212> PRT
<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> MISC_FEATURE
<222> (1)..(4)
<223> Fig. 38(b). E3 14.5kDa sequence

<400> 16

Gly Gly Asp Asp

1

<210> 17
<211> 955
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(955)
<223> Fig.47. Sequence of the right end of Ar17pAE2fFTrtex

<400> 17
agtgctaaaa agcgaccgaa atagcccggg ggaatacata cccgcaggcg tagagacaac 60

attacagccc ccataggagg tataacaaaa ttaataggag agaaaaacac ataaacacct 120

gaaaaaccct cctgcctagg caaaatagca ccctcccgct ccagaacaac atacagcgct 180

tcacagcggc agcctaacag tcagccttac cagtaaaaaa gaaaacctat taaaaaaaca 240

ccactcggat caattcgcgg gggtggccgg ggccagggct tcccacgtgc gcagcaggac 300

gcagcgctgc ctgaaactcg cgccgcgagg agagggcggg gccgcggaaa ggaaggggag 360

gggctgggag ggcccggagg gggctgggcc ggggacccgg gaggggtcgg gacggggcgg 420

ggtccgcgcg gaggaggcgg agctggaagg tgaaggggca ggacgggtgc ccgggtcccc 480

agtccctccg ccacgtgggg ctaggatcct taattaagaa ttctacaatt cccaacacat 540

acaagttact ccgccctaaa accctgggcg agtctccacg taaacggtca aagtccccgc 600

ggccctagac aaatattacg cgctatgagt aacacaaaat tattcagatt tcacttcctc 660

ttattcagtt ttcccgcgaa aatggccaaa tcttactcgg ttacgcccaa atttactaca 720

acatccgcct aaaaccgcgc gaaaattgtc acttcctgtg tacaccggcg cacaccaaaa 780

acgtcacttt tgccacatcc gtcgcttaca tgtgttccgc cacacttgca acatcacact 840

tccgccacac tactacgtca cccgccccgt tcccacgccc cgcgccacgt cacaaactcc 900

acccccctcat tatcatattg gcttcaatcc aaaataaggt atattattga tgatg 955

<210> 18
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature

<222> (1)..(24)
<223> Fig. 1C. SV40 early Poly(A) site

<220>
<221> polyA_site
<222> (3)..(24)
<223>

<400> 18
gcaaaaaaaa aaaaaaaaaa aaaa 24

<210> 19
<211> 737
<212> DNA
<213> Human

<220>
<221> CDS
<222> (108)..(539)
<223>

<400> 19
tattaggcca aaggcgcagc tactgtgggg tttatgaaca attcaagcaa ctctacgggc 60

tattctaatt caggtttctc taggatcttt ccgcagcagc cgccacc atg tgg ctg 116
Met Trp Leu
1

cag agc ctg ctg ctc ttg ggc act gtg gcc tgc agc atc tct gca ccc 164
Gln Ser Leu Leu Leu Leu Gly Thr Val Ala Cys Ser Ile Ser Ala Pro
5 10 15

gcc cgc tcg ccc agc ccc agc acg cag ccc tgg gag cat gtg aat gcc 212
Ala Arg Ser Pro Ser Pro Ser Thr Gln Pro Trp Glu His Val Asn Ala
20 25 30 35

atc cag gag gcc cgg cgt ctc ctg aac ctg agt aga gac act gct gct 260
Ile Gln Glu Ala Arg Arg Leu Leu Asn Leu Ser Arg Asp Thr Ala Ala
40 45 50

gag atg aat gaa aca gta gaa gtc atc tca gaa atg ttt gac ctc cag 308
Glu Met Asn Glu Thr Val Glu Val Ile Ser Glu Met Phe Asp Leu Gln
55 60 65

gag ccg acc tgc cta cag acc cgc ctg gag ctg tac aag cag ggc ctg 356
Glu Pro Thr Cys Leu Gln Thr Arg Leu Glu Leu Tyr Lys Gln Gly Leu
70 75 80

cgg ggc agc ctc acc aag ctc aag ggc ccc ttg acc atg atg gcc agc 404
Arg Gly Ser Leu Thr Lys Leu Lys Gly Pro Leu Thr Met Met Ala Ser
85 90 95

cac tac aag cag cac tgc cct cca acc ccg gaa act tcc tgt gca acc 452
His Tyr Lys Gln His Cys Pro Pro Thr Pro Glu Thr Ser Cys Ala Thr
100 105 110 115

cag act atc acc ttt gaa agt ttc aaa gag aac ctg aag gac ttt ctg 500
Gln Thr Ile Thr Phe Glu Ser Phe Lys Glu Asn Leu Lys Asp Phe Leu
120 125 130

```
ctt gtc atc ccc ttt gac tgc tgg gag cca gtc cag gag tgagtcgaca       549
Leu Val Ile Pro Phe Asp Cys Trp Glu Pro Val Gln Glu
            135                 140

agctctagat aacttcgtat aatgtatgct atacgaagtt atgctagaaa tggacggaat    609

tattacagag cagcgcctgc tagaaagacg cagggcagcg gccgagcaac agcgcatgaa    669

tcaagagctc caagacatgg ttaacttgca ccagtgcaaa aggggtatct tttgtctggt    729

aaagcagg                                                            737
```

<210> 20
<211> 144
<212> PRT
<213> Human

<400> 20

```
Met Trp Leu Gln Ser Leu Leu Leu Leu Gly Thr Val Ala Cys Ser Ile
1               5                   10                  15

Ser Ala Pro Ala Arg Ser Pro Ser Pro Ser Thr Gln Pro Trp Glu His
            20                  25                  30

Val Asn Ala Ile Gln Glu Ala Arg Arg Leu Leu Asn Leu Ser Arg Asp
        35                  40                  45

Thr Ala Ala Glu Met Asn Glu Thr Val Glu Val Ile Ser Glu Met Phe
    50                  55                  60

Asp Leu Gln Glu Pro Thr Cys Leu Gln Thr Arg Leu Glu Leu Tyr Lys
65                  70                  75                  80

Gln Gly Leu Arg Gly Ser Leu Thr Lys Leu Lys Gly Pro Leu Thr Met
                85                  90                  95

Met Ala Ser His Tyr Lys Gln His Cys Pro Pro Thr Pro Glu Thr Ser
            100                 105                 110

Cys Ala Thr Gln Thr Ile Thr Phe Glu Ser Phe Lys Glu Asn Leu Lys
        115                 120                 125

Asp Phe Leu Leu Val Ile Pro Phe Asp Cys Trp Glu Pro Val Gln Glu
    130                 135                 140
```

<210> 21
<211> 403
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(403)
<223> Fig. 50. E4 Transcription start sites in Ar17pAE2fFTrtex

<400> 21
atacagcgct tcacagcggc agcctaacag tcagccttac cagtaaaaaa gaaaacctat 60

taaaaaaaca ccactcggat caattcgcgg gggtggccgg ggccagggct tcccacgtgc 120

gcagcaggac gcagcgctgc ctgaaactcg cgccgcgagg agagggcggg gccgcggaaa 180

aggaacggga cgggctggga tggcccggaa ggggctgggc cggggacccg ggaagggttc 240

gggacggggc ggggttccgc gcggacgagg cggagctgga aggtgaaggg gcaggaccgg 300

tgcccgggtc cccagtccct ccgccacgtg gggctaggat ccttaattaa gaattctaca 360

attcccaaca catacaagtt actccgccct aaaaccctgg gcg 403

<210> 22
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(21)
<223> E1A Forward primer

<400> 22
agctgtgact ccggtccttc t 21

<210> 23
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(21)
<223> E1A Reverse primer

<400> 23
gctcgttaag caagtcctcg a 21

<210> 24
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
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<222> (1)..(23)
<223> E1A Probe

<400> 24
tggtcccgct gtgccccatt aaa 23

<210> 25
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(45)
<223> Primer sequence

<400> 25
caccettgcg tcagcccacg gtaccatggc ccacgagaga aaggc 45

<210> 26
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(45)
<223> Primer sequence

<400> 26
ccttaaaatc cacctttgg gttcattttt ggactggttt tttgc 45

<210> 27
<211> 47
<212> DNA
<213> Artificial Sequence

<220>

<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(47)
<223> Primer sequence

<400> 27
caccttgcg tcagcccacg gtaccatgtg gctgcagagc ctgctgc 47

<210> 28
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
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<222> (1)..(45)
<223>

<400> 28
ccttaaaatc cacctttggg gttcactcct ggactggctc ccagc 45

<210> 29
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(22)
<223> Fig.25. E3.1 sequence primer

<400> 29
cctgccggga acgtacgagt gc 22

<210> 30
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(31)
<223> Fig. 25. E3.2 sequence primer

<400> 30
ctgcagccac atcttgggtg gcgaccccag c 31

<210> 31
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(37)
<223> Fig.25. E3.2b. Sequence primer

<400> 31
ctgcagccac atggttatct tgggtggcga ccccagc 37

<210> 32
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(30)
<223> Fig.25. E3.2C. Primer sequence

<400> 32
ctgcagcctc atcttgggtg gcgacccagc 30

<210> 33
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(32)
<223> Fig25. E3.5. Primer sequence

<400> 33
ctctcgtggg ccatcttggg tggcgacccc ag 32

<210> 34
<211> 38
<212> DNA

<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(38)
<223> Fig.25. E3.5b primer sequence

<400> 34
ctctcgtggg ccatggttat cttgggtggc gaccccag 38

<210> 35
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(32)
<223> Fig.25. E3.5c primer sequence

<400> 35
ctctcgtggg tcatcttggg tggcgacccc ag 32

<210> 36
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(38)
<223> Fig.25. E3.5d primer sequence

<400> 36
ctctcgtggg ccatggtcat cttgggtggc gaccccag 38

<210> 37
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature

<222> (1)..(32)
<223> Fig.25. E3.6 primer sequence

<400> 37
ccaaaaataa tttactaagt tacaaagcta at 32

<210> 38
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(36)
<223> Fig.25. E3.7 primer sequence

<400> 38
gtaacttagt aaattacttg ggtggcgacc ccagcg 36

<210> 39
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(37)
<223> Fig.25. E3.7b primer sequence

<400> 39
gtaacttagt aaattatctt gggtggcgac cccagcg 37

<210> 40
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(32)
<223> Fig.25. E3.8 primer sequence

<400> 40
cgccacccaa gtaatttact aagttacaaa gc 32

<210> 41
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(33)
<223> Fig.25. E3.8b primer sequence

<400> 41
cgccacccaa gataatttac taagttacaa agc 33

<210> 42
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(28)
<223> Fig25. E3a.3 primer sequence

<220>
<221> misc_feature
<222> (1)..(28)
<223> Fig.25. E3a.3 primer sequence

<400> 42
ccaggagtaa tttactaagt tacaaagc 28

<210> 43
<211> 20
<212> DNA
<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(20)
<223> Fig.25. E3a.4 primer sequence

<400> 43
gtccggtagc ggcggccgcg 20

<210> 44
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(31)
<223> Fig.25. E3m.1 primer sequence

<400> 44
cgccacccaa gatggcccac gagagaaagg c 31

<210> 45
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(37)
<223> Fig.25. E3m.b primer sequence

<400> 45
cgccacccaa gataaccatg gcccacgaga gaaaggc 37

<210> 46
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(31)
<223> Fig.25. E3m.c primer sequence

<400> 46
cgccacccaa gatgacccac gagagaaagg c 31

<210> 47
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(37)
<223> Fig.25. E3m.d primer sequence

<400> 47
cgccacccaa gatgaccatg gcccacgaga gaaaggc 37

<210> 48
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(32)
<223> Fig.25. E3h.1 primer sequence

<400> 48
cgccacccaa gatgtggctg cagagcctgc tg 32

<210> 49
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(39)
<223> Fig.25. E3h.b primer sequence

<400> 49
cgccacccaa gataaccatg tggctgcaga gcctgctgc 39

<210> 50
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(33)
<223> Fig.25. E3h.c primer sequence

<400> 50
cgccacccaa gatgaggctg cagagcctgc tgc 33

<210> 51
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(42)
<223> Fig.25. E3IM-1 primer sequence

<400> 51
ggggtcgcca cccaagatga caattccgcc ccccccctaa cg 42

<210> 52
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(24)
<223> Fig.25. E3IM-2 primer sequence

<400> 52
gtcatcttgg gtggcgaccc cagc 24

<210> 53
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(30)
<223> Fig.25. IRES1 primer sequence

<400> 53
tccccccggg caattccgcc ccccccctaa 30

<210> 54
<211> 32
<212> DNA

<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(32)
<223> Fig.25. IRES3 primer sequence

<400> 54
ctctcgtggg ccatggtatt atcgtgtttt tc 32

<210> 55
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(37)
<223> Fig.25. MGm1 primer sequence

<400> 55
gaaaaacacg ataataccat ggcccacgag agaaagg 37

<210> 56
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(29)
<223> Fig.25. MGm2 primer sequence

<400> 56
gcatgttaac ttcctcattt ttggactgg 29

<210> 57
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature

<222> (1)..(25)
<223> Table 27. 147A primer sequence

<400> 57
cgggttctat gtaaactcct tcatg 25

<210> 58
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(44)
<223> Table.27. 147BH primer sequence

<220>
<221> misc_feature
<222> (1)..(44)
<223> Table 27. 147BH primer sequence

<400> 58
gcagccacat ggtcagtcgt ctcctcctgt tagattaaag tagc 44

<210> 59
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(45)
<223> Table 27. 147CH primer sequence

<400> 59
ctaacaggag gagacgactg accatgtggc tgcagagcct gctgc 45

<210> 60
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(44)

<223> Table 27. 147DH primer sequence

<400> 60
gctttattat tttttttat tactcctgga ctggctccca gcag 44

<210> 61
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(34)
<223> Table 27. 147EH primer sequence

<400> 61
ccaggagtaa taaaaaaaaa taataaagca tcac 34

<210> 62
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(26)
<223> Table 27. 147F primer sequence

<400> 62
ggccgttgcc cattttgagc gcaagc 26

<210> 63
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(45)
<223> Table 27. Ar16.1

<400> 63
ctaacaggag gagacgactg ataaaaaaaa ataataaagc atcac 45

<210> 64
<211> 47
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(47)
<223> Table 27. Ar16.2 primer sequence

<400> 64
gctttattat ttttttttat cagtcgtctc ctcctgttag attaaag 47

<210> 65
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(28)
<223> oligonucleotide primer forward

<400> 65
gtccctgagc tgttcttctg ccccatac 28

<210> 66
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(29)
<223> oligonucleotide primer reverse

<400> 66
agcaggaggg aacagagctg ttaggaagc 29

<210> 67
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(21)
<223> E1A Forward primer

<400> 67
agctgtgact ccggtccttc t 21

<210> 68
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(21)
<223> E1A Reverse primer

<400> 68
gctcgttaag caagtcctcg a 21

<210> 69
<211> 23
<212> DNA
<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(23)
<223> E1A probe

<400> 69
tggtcccgct gtgccccatt aaa 23

<210> 70
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(19)
<223> Hexon Forward primer

<400> 70
cttcgatgat gccgcagtg 19

<210> 71
<211> 19
<212> DNA
<213> Artificial sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(19)
<223> Hexon reverse primer

<400> 71
gggctcaggt actccgagg 19

<210> 72
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(25)
<223> Hexon probe

<400> 72
ttacatgcac atctcgggcc aggac 25

<210> 73
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(22)
<223> Table 30. OV20 primer used to make E4 promoter deletion

<400> 73
ggcgtgaccg taaaaaaact ggtcaccgtg at 32

<210> 74
<211> 39
<212> DNA

<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(39)
<223> Table 30. OV21 primer used to make E4 promoter deletion

<400> 74
cgccttaatt aaggatccga gtggtgtttt tttaatagg 39

<210> 75
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(30)
<223> Table 39. PCR 1.f forward primer sequence

<400> 75
ggaatacata cccgcaggcg tagagacaac 30

<210> 76
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(29)
<223> Table 39. PCR 2.f Forward primer sequence

<400> 76
cacataaaca cctgaaaaac cctcctgcc 29

<210> 77
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature

<222> (1)..(29)
<223> Table 39. PCR 3.r reverse primer sequence

<400> 77
tttactggta aggctgactg ttaggctgc 29

<210> 78
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(28)
<223> Table 39. PCR 4.r reverse primer sequence

<400> 78
agtttcaggc agcgctgcgt cctgctgc 28

<210> 79
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(31)
<223> Table 39. PCR 5.r reverse primer sequence

<400> 79
gggcggagta acttgtatgt gttgggaatt g 31

<210> 80
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(30)
<223> Table 39. ExtP 1 forward primer sequence

<400> 80
acagcgcttc acagcggcag cctaacagtc 30

<210> 81
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(19)
<223> Hexon forward primer sequence

<400> 81
cttcgatgat gccgcagtg 19

<210> 82
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(19)
<223> Hexon reverse primer sequence

<400> 82
gggctcaggt actccgagg 19

<210> 83
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(25)
<223> Hexon probe sequence

<400> 83
ttacatgcac atctcgggcc aggac 25

<210> 84
<211> 21
<212> DNA
<213> Artificial Sequence

<220>

<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(21)
<223> E1a Foward primer sequence

<400> 84
agctgtgact ccggtccttc t 21

<210> 85
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(21)
<223> E1A reverse primer sequence

<400> 85
gctcgttaag caagtcctcg a 21

<210> 86
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(23)
<223> E1a probe sequence

<400> 86
tggtcccgct gtgccccatt aaa 23

<210> 87
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(24)
<223> E4 orf63 Forward primer sequence

<400> 87
tctgtctcaa aaggaggtag acga 24

<210> 88
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(22)
<223>

<220>
<221> misc_feature
<222> (1)..(22)
<223> E4 orf63 Reverse primer sequence

<400> 88
gaccaacacg atctcggttt gt 22

<210> 89
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(23)
<223> E4 orf63 Probe sequence

<400> 89
ccctactgta cggagtgcgc cga 23

<210> 90
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(19)
<223> Hexon forward primer sequence

<400> 90

cttcgatgat gccgcagtg 19

<210> 91
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
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<220>
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<222> (1)..(19)
<223> Hexon reverse primer sequence

<400> 91
gggctcaggt actccgagg 19

<210> 92
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
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<222> (1)..(25)
<223> Hexon probe sequence

<400> 92
ttacatgcac atctcgggcc aggac 25

<210> 93
<211> 397
<212> DNA
<213> Human

<220>
<221> promoter
<222> (1)..(397)
<223> A 397 bp fragment of the hTERT promoter

<400> 93
ccctcgctgg cgtccctgca ccctgggagc gcgagcggcg cgcgggcggg gaagcgcggc 60

ccagaccccc gggtccgccc ggagcagctg cgctgtcggg gccaggccgg gctcccagtg 120

gattcgcggg cacagacgcc caggaccgcg cttcccacgt ggcggaggga ctggggaccc 180

gggcacccgt cctgcccctt caccttccag ctccgcctcc tccgcgcgga ccccgccccg 240

tcccgacccc tcccgggtcc ccggcccagc cccctccggg ccctcccagc ccctcccctt 300

cctttccgcg gccccgccct ctcctcgcgg cgcgagtttc aggcagcgct gcgtcctgct 360

gcgcacgtgg gaagccctgg ccccggccac ccccgcg 397

<210> 94
<211> 245
<212> DNA
<213> Human

<220>
<221> promoter
<222> (1)..(245)
<223> A 245 bp fragment of the hTERT promoter

<400> 94
ccccacgtgg cggagggact ggggacccgg gcacccgtcc tgcccccttca ccttccagct 60

ccgcctcctc cgcgcggacc ccgccccgtc ccgacccctc ccgggtcccc ggcccagccc 120

cctccgggcc ctcccagccc ctccccttcc tttccgcggc cccgccctct cctcgcggcg 180

cgagtttcag gcagcgctgc gtcctgctgc gcacgtggga agccctggcc ccggccaccc 240

ccgcg 245

<210> 95
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(19)
<223> Hexon forward primer sequence

<400> 95
cttcgatgat gccgcagtg 19

<210> 96
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
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<222> (1)..(19)
<223> Hexon reverse primer sequence

<400> 96

gggctcaggt actccgagg 19

<210> 97
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(25)
<223> Hexon probe sequence

<400> 97
ttacatgcac atctcgggcc aggac 25

<210> 98
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Viral vector sequence

<220>
<221> misc_feature
<222> (1)..(20)
<223> Fig. 26b(2).

<400> 98
cgccacccaa gataaccatg 20